STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

A STUDY OF CHINOOK SALMON IN SOUTHEASTERN ALASKA

by

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Section L

Study AFS 41 Page No.
A Study if Chinook Salmon
in Southeast Alaska

Job No. AFS 41-6
Status of Important Native Chinook Salmon Stocks in Southeastern Alaska — Paul Kissner

RESEARCH PROJECT SEGMENT

State:	Alaska	Name:	Sport Fish Investigations of Alaska
Project No.:	F-9-10		
Study No.:	AFS 41	Study Title:	A STUDY OF CHINOOK SALMON IN SOUTHEAST ALASKA
Job No.:	AFS 41-6	Job Title:	Status of Important Native Chinook Salmon Stocks in Southeastern Alaska

Period Covered: July 1, 1977 to June 30, 1978.

ABSTRACT

The enumerated escapement of 5,671 five and six-year-old chinook salmon, Oncorhynchus tshawytscha (Walbaum), into the Taku River was the best recorded escapement since 1959. Comparison of age data collected at the Nakina carcass weir during 1977 indicates that the return of six-year-old chinook to the Taku River in 1978 will be average and the return of five-year-olds very weak.

Escapement information on chinook salmon spawning in the Stikine, Unuk, Chickamin, Situk, Chilkat, Keta, Blossom and King Salmon rivers is presented. Escapement levels were generally higher than those observed during the last several years.

Chinook salmon smolts and rearing juveniles were captured in various tributaries of Taku River by baited minnow traps for coded wire tagging. During May, 9,902 one-check smolts were micro-wire tagged near the mouth of the Taku River, and during September and October 8,494 rearing juveniles were tagged on the Nahlin River and 21,879 tagged on the mainstem Taku.

Information on capturing juvenile chinook salmon on the Stikine, Unuk and Chickamin rivers for coded wire tagging is presented. It appears that the mainstem Stikine River is not a major rearing area for juvenile chinook salmon and the Unuk and Chickamin river chinook stocks may be at such a low level that large numbers of juveniles cannot be captured for tagging.

Attempts to capture large numbers of walleye pollock, Theragra chalcogrammus (Pallas), near the mouth of the Taku River to determine if they were feeding on chinook smolts was unsuccessful; it appears that the lack of walleye pollock observed in this area was related to a pollock dieoff in the Juneau vicinity during 1977.

BACKGROUND

Spring run chinook salmon stocks are at a low level along much of the Pacific Coast. In some areas declining population levels are partially associated with losses of habitat. Examples of such habitat loss include the impounding or damming of flow on the Columbia and Sacramento rivers which has destroyed both spawning areas and rearing habitat for juveniles.

Although most chinook salmon river systems to the north of the Columbia have not suffered from losses of habitat or water quality, the stocks of chinook have declined. We believe the major reason for their decline is overharvest. The chinook salmon is the only salmon species which is available to sport and commercial troll fisheries for up to three or four years, and in addition is often subjected to net fisheries near their river of origin.

In an attempt to rebuild depleted Southeast Alaska spring chinook stocks, gillnet fisheries which have operated near or in the mouths of the Alsek, Taku and Stikine rivers have been eliminated or severely restricted to protect returning spawning runs. In many areas sport and commercial troll closures or reductions in bag limits have also been made to protect maturing native chinook.

Although these closures and restrictions imposed on some of our terminal fisheries have increased escapements, further restrictions on harvest of immature chinook may be needed to rebuild stocks. Coded wire tagging of important Southeast chinook stocks will permit us to follow the migratory routes of various stocks during marine rearing and thereby determine areas of exploitation.

RECOMMENDATIONS

Management

1. A method of obtaining samples from sublegal, adipose clipped chinook salmon caught in sport and commercial fisheries throughout Southeastern Alaska should be developed through fishing regulations.

   With the present Sport and Commercial Fish regulations in effect on the 28" T.L. minimum size of chinook, little information on migratory routes or areas of concentrations of juvenile native chinook stocks will be available until late summer of their second ocean year. It may be that areas where juvenile chinook rear during their first and second ocean years are considerably different from the areas they frequent during subsequent years. It may be that exploitation (hook and release) as sublegals is more detrimental to the population than actual harvesting at a larger size, if the areas they frequent during the first several years are areas of large amounts of fishing effort.

2. Restrictive regulations designed to protect maturing chinook salmon stocks near their rivers of origin should be continued. Southeast chinook stocks are still at a low level and continued restrictions are necessary to rebuild the stocks.

3. The Taku River drift gillnet fishery should be monitored from the third week of June until mid-July to insure that large numbers of immature chinook are not being harvested incidentally to the sockeye fishery.

Research

1. The effect on spawning success of capturing and releasing prespawning and spawning chinook salmon on commonly used sport gear in the Nakina River should be determined because of reports that individuals are catching and releasing up to 60 chinook per day.

2. Coded wire tagging of chinook salmon smolts and juveniles should be conducted during April, May, September, and October on the Taku and Stikine rivers to determine marine migration patterns and areas of harvest at various life history stages. Detection of these areas are important to give additional protection to depleted stocks.

3. The feasibility of capturing large numbers of rearing juveniles for future coded wire tagging in the Chickamin and Unuk rivers should be determined.

4. Escapement of chinook salmon in the major and medium chinook salmon spawning systems in Southeast should be monitored by aerial, ground and weir enumeration.

5. Delayed release of native Taku River chinook smolts should be attempted to determine how this would affect migration. Studies conducted with cultured chinook in Washington indicate that delayed release may be a technique to keep salmonids in a localized area.

OBJECTIVES

1. Determine the catch and escapement of Taku River chinook salmon.

2. Determine the potential of walleye pollock as a significant predator on chinook salmon smolts at the mouth of the Taku River.

3. Determine the effect on migration of delayed release of native Taku chinook smolts.

4. Determine the catch and escapement of Stikine River chinook salmon.

5. Determine the catch and escapement of Chickamin and Unuk River chinook salmon.

6. Determine the escapement of chinook salmon in other important spawning rivers of Southeast Alaska.

TECHNIQUES USED

Commercial chinook salmon harvest data were taken from statistical runs which were compiled from individual fish tickets. Mid-eye to fork of tail measurements were made of chinook salmon sampled in the gill net fisheries and on the spawning grounds.

Attempts were made to capture walleye pollock by midwater and bottom trawl and by fishing 150 fathoms of 6 3/8" stretched measure nylon gill net.

During August, 1977, a tripod weir was operated on the Nakina River approximately 137 meters above the junction with the Silver Salmon River. Chinook spawning above the weir were enumerated after they could no longer maintain station in the river and floated against the weir face. The structure was cleaned of carcasses at 10 a.m. and 7 p.m. daily. All species were enumerated, and length data, scale samples and sex determination were collected from the chinook.

Upriver surveys of both banks of the river were conducted every other day to enumerate and sample spawned-out chinook which had not floated downriver to the weir. The survey area extended approximately 2.4 kilometers above the weir.

All escapement surveys were conducted by foot or by "Aloutte II", "Huges 500" or "Hiller 12E" helicopters. Only three and four ocean chinook (600 mm total length or larger) were enumerated during aerial and foot surveys.

Gee minnow traps baited with salmon roe were used exclusively to capture rearing salmonidae.

Chinook smolts and rearing juveniles were anesthetized with MS 222, marked by removal of the adipose fin and micro-wire tagged with a Northwest Marine Technology, Inc. tag injector. The tagging unit was modified to function under remote field conditions by conversion to a 24 volt battery system (Koerner, 1977).

The micro-wire tags purchased were made of type 302 stainless steel wire and were .25 mm in diameter and 1.0 mm in length. A code, based on the binary system, was etched into the surface of the wire to identify the agency tagging and the specific treatment of the individual.

To obtain maximum retention of the micro-wire tags they must be implanted in the cartilaginous wedge in the fish's snout. Several fish were thus sampled daily to insure proper tag placement. The fish's skull was bisected by a vertical incision through the dorsal median plane to the oral cavity. The tag was then readily observed in the fish's snout. If the tag was improperly placed, adjustments in the depth of the head mold were made and several more fish checked to insure proper placement.

The micro-wire tags were magnetized by dropping the tagged fish head first through a ring magnet into a bucket of water. The fish were then passed through a NMT field sampling detector to check for the presence of a magnetized tag.

Samples of chinook smolts and rearing juveniles were collected for age and growth determinations. Fish were measured from the tip of the snout to the fork of the tail to the nearest mm and several scales were taken from the preferred area at the posterior edge of the dorsal fin, two rows above the lateral line.

To determine the age of chinook harvested in various sport and commercial fisheries in Southeast, and on the spawning grounds, scales were collected. Scales were taken in the preferred area, two rows above the lateral line and slightly posterior to the insertion of the dorsal fin. Because of the high occurrence of regeneration in chinook scales, five extra scales were taken from each side of each fish near the preferred area and placed in a numbered coin envelope.

Scales were later examined under a binocular microscope and the first complete scale was soaked in detergent, cleaned and mounted on a numbered gum card. They were pressed in cellulose acetate and analyzed under an Eberback micro-projector at the magnification of 80 X.

FINDINGS

Taku River Studies

Drift Gillnet Fishery in Taku Inlet:

The spring drift gillnet fishery in Taku Inlet has been closed during 1976 and 1977 to protect maturing Taku River chinook salmon, O. tshawytscha (Walbaum). The fishery now opens on the third Monday in June and 5 3/8" - 5 1/2" stretched measure nylon mesh gill nets are utilized to harvest primarily sockeye salmon, O. nerka (Walbaum). The catch was monitored in 1977 as during 1972-1976 (Kissner, 1973-1977) to determine the incidental catch of mature and immature chinook salmon from the opening date through mid-July. Less than 300 maturing three and four ocean chinook were harvested during this period and the total catch of mature and immature chinook for 1977 was only 752.

Escapement:

The 1977 escapement of chinook salmon into the Nakina River, which is the major clearwater chinook spawning tributary of the Taku River, was the best observed since 1959 (Table 1). Enumeration of spawners was conducted during the peak of spawning on July 29, and 3,850 three and four ocean chinook were enumerated. Removal of two large rocks at Village Falls on the Nakina River during March, 1977 by the Canadian Department of Environment, Fisheries Service, eliminated a partial barrier and spawning distribution was near normal (Kissner, 1977). Enumeration of spawners into the index area above the Nakina carcass weir was also the best observed since 1959 (Table 2).

Table 1. Escapement of chinook salmon into the Nakina River.

Date	Total Chinook (excludes Jacks)	Carcass Weir (excludes jacks)	Jacks at Carcass Weir
1951	5,000		
1952	9,000		
1953	7,500		
1954	6,000		
1955	3,000		
1956	1,380	814	1,963
1957	1,500*	748	1,948
1958	2,500*	1,328	3,739
1959	4,000*	2,097	1,973
1960	Poor		
1961	Poor		
1965	3,050		
1972	1,000		
1973	2,000	1,136	1,189
1974	1,800	814	1,448
1975	1,800	223	733
1976	3,000	720**	476
1977	3,850	1,801	1,579

* Counts of total river not conducted - comparison made from carcass weir enumeration.

** Carcass weir moved about five miles downriver because of Village Falls Barrier.

Table 2. Total chinook enumerated by sex at the Nakina carcass weir and upriver.

Year	Female	Male	Total	Sex Ratio
1956	424	2,353	2,777	1: 5.55
1957	403	2,327	2,730	1: 5.77
1958	644	4,423	5,067	1: 6.87
1959	1,202	2,890	4,092	1: 2.40
1973	617	1,713	2,330	1: 2.78
1974	420	1,842	2,262	1: 4.39
1975	69	887	956	1:12.86
1976*	418	889	1,307	1: 2.13
1977	1,144	2,240	3,384	1: 1.96

* Partial weir at Grizzly Bar.

Sampling of carcasses at the carcass weir indicated that age class 1.4 (chinook in their sixth year of life) was very strong, age 1.3 was average, age 1.2 was very weak and age 1.1 was quite strong (Table 3). Based on the relative strength of each year class during 1977, it appears that the 1978 escapement will have an average return of six-year-old spawners and a weak return of five-year-olds.

Peak escapement counts of other chinook salmon systems monitored annually on the Taku River are presented in Table 4.

Juvenile Chinook Studies:

Juvenile chinook salmon were captured in the Taku River Drainage during 1974, 1975, and 1976 to determine their availability by tributary and season for coded wire tagging (Kissner, 1977).

It was determined that the major chinook spawning tributary (Nakina River) was not a major rearing area and that these juvenile chinook were probably rearing in the mainstem glacial Taku River. Juvenile chinook were captured in the mainstem in the greatest numbers during October, when the water had dropped and cleared, and were also captured in lesser numbers as smolts at the mouth of Taku River during May and June. A good population of rearing juvenile chinook was also detected in the Nahlin River.

Smolt Tagging:

Because of the extremely mild temperatures in Southeast Alaska during the winter of 1976-1977, the mainstem Taku River remained ice free except for a brief period during January. To determine the approximate onset of the chinook smolt migration, minnow trapping was conducted on the mainstem on March 10-11 and April 1-2. Results indicated that the migration had not yet commenced as only five chinook smolts were captured near the mouth of Taku River.

Daily capturing and tagging of chinook smolts began on April 19, and ended on June 9. Because trap catches were greatly influenced by water level and turbidity, little can be said about the timing of the smolt migration except that it appeared to begin between April 1, and April 19, and was mostly completed by June 1.

During the 49 days of trapping 7,548 minnow traps were checked and 9,902 chinook smolts were captured and tagged (Table 5). An additional 5,475 juvenile coho salmon, O. kisutch (Walbaum), over 90 mm F.L. were incidently caught and held, to be micro-wire tagged by the Coho Research Project.

Several codes were used during the chinook tagging to attempt to determine the effect of out-migrant timing on survival.

The chinook smolts averaged 79.7 mm F.L. (Table 6) while in 1960 Meehan and Siniff (1962) captured chinook smolts by scoop trap and their samples averaged 73.3 mm F.L.

Table 3. Number and age of male and female chinook salmon sampled at the Nakina carcass weir, by year.

MALE

Age	1956	1957	1958	1959	1973	1974	1975	1976*	1977
1.1	754	699	1,335	838	336	730	228	64	1,145
1.2	1,201	1,249	2,404	1,132	853	718	505	412	434
1.3	312	242	561	611	273	267	90	236	283
1.4	86	110	123	298	242	124	63	95	368
1.5	0	0	0	0	7	3	1	4	7
n	2,353	2,300	4,423	2,879	1,711	1,842	887	811	2,237

FEMALE

Age	1956	1957	1958	1959	1973	1974	1975	1976*	1977
1.2	8	0	0	3	0	0	0	0	0
1.3	287	274	469	778	210	197	38	206	298
1.4	129	122	175	410	404	223	31	179	834
1.5	0	0	0	0	0	0	0	0	11
n	424	396	644	1,191	614	420	69	385	1,143

* Partial weir at Grizzly Bar.

Table 4. Escapement of chinook salmon in the Taku River, 1951-1977.

Year	Nakina	Kowatua	Tatsamenie	Dudidontu	Tseta	Nahlin
11951	5,000	---	---	400	100	1,000
1952	9,000	---	---	---	---	---
1953	7,500	---	---	---	---	---
1954	6,000	---	---	---	---	---
1955	3,000	---	---	---	---	---
1956	1,380	---	---	---	---	---
1957	1,500	---	---	---	---	---
1958	2,500	---	---	4,500	---	2,500
1959	4,000	---	---	---	---	---
1960	Poor	---	---	---	---	---
1961	Poor	---	---	---	---	---
1962	---	---	---	25	81	216
1963	---	---	---	---	---	---
1964	---	---	---	---	---	---
1965	3,050	200 G	50 G	100	18	37
1966	---	14 G	150 G	267	150	300
1967	---	250 G	---	600	350	300
1968	---	1,100 E	800 E	640	230	450
1969	---	3,300 E	800 E	---	---	---
1970	---	1,200 E	530 E	10	25	26
1971	---	1,400 E	320 E	165	---	473
1972	1,000	130 G	170 G	103	80	280
1973	2,000	100 G	200 G	200	---	300
1974	1,800	235 G	120 G	20	4	900
1975	1,800	---	---	15	---	274
1976	3,000	341 G	620 E	40	---	725
1977	3,850	580 G	573 E	18	---	650

G = water glacial

E = water clear

--- = No data or survey not comparible

Table 5. Minnow traps checked and chinook salmon smolts tagged by date and code on Taku River, 1977.

Date	Traps Checked	Chinook Tagged	Code
4/20	151	405	5- 8
4/21	144	403	5- 8
4/22	134	245	5- 8
4/23	168	286	5- 8
4/24	158	336	5- 8
4/25	162	173	5- 8
4/26	152	144	5- 8
4/27	147	54	5- 8
4/28	114	34	5- 8
4/29	113	24	5- 8
4/30	-	-	-
5/01	120	28	5- 8
5/02	127	152	5- 8
5/03	144	247	5- 8
5/04	148	297	5- 8
5/05	147	292	5- 8
5/06	159	339	5- 8
5/07	159	463	5- 8
5/08	159	269	5- 8
5/09	171	225	5- 8
5/10	171	416	5- 8
5/11	183	462	5- 8
5/12	192	669	5- 9
5/13	192	469	5- 9
5/14	205	574	5- 9
5/15	206	482	5- 9
5/16	205	216	5- 9
5/17	187	277	5- 9
5/18	184	470	5- 9
5/19	192	176	5- 9
5/20	205	62	5- 9
5/21	205	23	5- 9
5/22	205	117	5- 9
5/23	141	93	5- 9
5/24	160	119	5- 9
5/25	219	218	5- 9
5/26	219	145	5- 9
5/27	218	187	5- 9
5/28	219	172	5- 9
5/29	201	86	5- 9
5/30	-	-	-
5/31	201	53	5-10
6/01	220	0	-
6/02	30	0	-
6/03	33	0	-
6/04	70	0	-
6/05	61	0	-
6/06	59	0	-
6/07	65	0	-
6/08	64	0	-
6/09	59	0	-
	7,548	9,902	

Table 6. Length frequency of Taku River chinook salmon smolts sampled during April and May, 1977.

Fork Length	n	Fork Length	n	Fork Length	n
60	1	80	25	100	1
61	0	81	23	101	0
62	1	82	16	102	3
63	1	83	11	103	1
64	0	84	11	104	0
65	4	85	10	105	1
66	3	86	11	106	4
67	4	87	9	107	0
68	7	88	10	108	0
69	5	89	5	109	0
70	9	90	10	110	0
71	18	91	5	111	0
72	16	92	11	112	2
73	16	93	4		
74	19	94	0		
75	17	95	3	Total Sampled 401	
76	22	96	0		
77	29	97	2	$\bar{x}$ = 79.7 mm	
78	23	98	0		
79	27	99	1		

The number of chinook smolts captured and tagged on Taku River during April and May was lower than anticipated. Trapping conducted during the spring of 1976 averaged seven chinook per trap, while during 1977 the best days catch was less than four chinook per trap and the seasonal average was only 1.3 chinook per trap. The enumerated escapement of chinook spawners was about 40% higher in 1974 (the brood year for the 1976 out-migration) than during 1975 so quite possibly there were more migrants available for capture in 1976 than in 1977.

One problem encountered during the spring trapping was the lack of habitat available for efficient operation of the minnow traps. The traps fish most efficiently when set out of the current, and during low water encountered on the Taku River during the spring, most of the debris, log jams and other habitat that breaks or deflects the current are above the level of the river.

In an effort to increase the number of smolts tagged, the mainstem will be trapped between the Tulsequah and King Salmon River from about April 1 to May 20. This area contains abundant juvenile chinook rearing habitat and many areas where minnow traps will fish efficiently.

Nahlin River Juvenile Tagging:

The Upper Nahlin River is a major rearing tributary for juvenile chinook salmon. Preliminary sampling, which was conducted in 1974, indicated the possibility of good numbers of juveniles. An intensive study was thus conducted during the summer of 1975 to determine if large numbers of juvenile chinook could be captured by baited minnow traps for future coded wire tagging, population dynamics studies, and to attempt to estimate the population (Kissner, 1976).

Foot travel along the lower 56 kilometers of the Nahlin is limited by steep cliffs except at low water, and river boat travel is impossible because of large bouldered riffles. Major emphasis was therefore placed on a 10 air mile (16 kilometers) long section of the Nahlin above this area, where riverboat travel was possible. This part of the river flows through a broad valley; it is typically deep, slow moving and meandering with numerous oxbows and beaver dams. Immediately above and below this section are the most concentrated chinook spawning areas in the Nahlin system.

A total of 8,494 young-of-the-year chinook salmon were captured in 5,484 minnow trap sets, tagged with micro-wire tags and released during a 20 day period in September (Table 7). The fish ranged between 52 mm F.L. and 91 mm F.L. and averaged 68.5 mm F.L. (Table 8).

Mainstem Juvenile Tagging:

Young-of-the-year juvenile chinook were also captured in the mainstem glacial Taku River between Tulsequah and King Salmon rivers during October, 1977. This section of the mainstem is typically braided with numerous side sloughs and log jams. Juvenile chinook were closely

Table 7. Minnow traps checked and young-of-the-year chinook salmon tagged by date and code on the Nahlin River, 1977.

Date	Traps Checked	Chinook Tagged	Code
9/08	221	---	---
9/09	251	---	---
9/10	248	---	---
9/11	243	3,262	17-8
9/12	---	---	---
9/13	---	---	---
9/14	226	647	17-8
9/15	212	377	17-8
9/16	295	341	17-8
9/17	295	---	---
9/18	296	465	17-8
9/19	296	---	---
9/20	295	865	17-9
9/21	295	---	---
9/22	291	700	17-9
9/23	292	---	---
9/24	291	440	17-9
9/25	291	---	---
9/26	291	383	17-9
9/27	280	---	---
9/28	286	406	17-9
9/29	289	608	17-9
	5,484	8,494	

Table 8. Length frequency of young-of-the-year chinook salmon sampled on the Nahlin River during September, 1977.

Fork Length	n	Fork Length	n	Fork Length	n
52	1	68	32	84	4
53	1	69	23	85	2
54	1	70	23	86	1
55	1	71	25	87	0
56	0	72	12	88	0
57	2	73	19	89	0
58	5	74	12	90	1
59	2	75	11	91	2
60	12	76	14		
61	10	77	8		
62	20	78	4	Total Sampled 402	
63	25	79	5		
64	26	80	6	$\bar{x}$ = 68.5 mm	
65	33	81	1		
66	35	82	3		
67	18	83	2		

associated with these log jams and cover in the main channels, and with places where the river braided and the water was shallow; large numbers were captured in log jams and at the base of riffles with no cover present. As a general rule, the more braided the area, the more log jams present, the greater the catch of rearing chinook.

Past trapping conducted in this area indicated that as the Taku River drops and becomes less turbid in the fall large numbers could be captured (Kissner, 1977).

During nine days of trapping 860 minnow trap sets caught a total of 21,879 juvenile chinook salmon (Table 9). Chinook were abundant in all areas trapped, but the highest concentrations were located on "King Salmon Flats" near the major chum salmon spawning slough of the Taku River.

The limiting factor during this time was that because of the small size of the fish captured (Table 10) only 2,500-3,000 could be micro-wire tagged by a three man crew during a day.

Because of the large concentrations of juvenile chinook encountered in the mainstem and the relatively low cost of the operation, major emphasis should be placed on this area in the future.

Effect of Delayed Release on Migration of Native Taku River Chinook Smolts:

Because of the lower than anticipated number of chinook smolts captured in May, 1977, the experiment on effect of delayed release on migration was not attempted on Taku River. If over 50,000 chinook smolts are captured during April and May, 1978, the experiment will be conducted.

Effect of Walleye Pollock on Chinook Smolts:

Because the Taku River chinook salmon population is at a low level, it was felt necessary to determine if the large numbers of walleye pollock, Theragra chalcogrammus (Pallas), observed off of the river mouth in past years were feeding on significant numbers of out-migrant chinook smolts.

On May 2, a chartered vessel attempted to capture walleye pollock with a trawl. The gear was fished both midwater and on the bottom for five hours with no success.

On May 16, and 22, a gill net vessel was chartered to fish 150 fathoms of six and three-eighths inch stretched measure nylon gill net. In 1973, we made a set off of the mouth of Taku River with this gear size and the catch was more than 100 walleye pollock in a one-half hour set; however, in 1977 over 15 hours of gill netting in this area produced only two pollock. The stomach of one of the specimens was empty and the other contained six euphausiids.

The apparent lack of walleye pollock in this area was unusual; however, a paper documenting pollock mortality in this area during 1977, based on

Table 9. Minnow traps checked and young-of-the-year chinook salmon tagged by date and code on the Taku River during October, 1977.

Date	Traps Checked	Chinook Tagged	Code
10/12	90	-	
10/13	78	1,665	17-10
10/14	95	2,693	17-10
10/15	40	150	17-11
10/16	-		
10/17	-	1,627	17-11
10/18	-	2,691	17-11
10/19	-	2,693	17-12
10/26	67	-	
10/27	127	2,103	17-12
10/28	129	3,410	17-13
10/29	121	2,724	17-13
10/30	113	2,123	17-14
	860	21,879	

Table 10. Length frequency of young-of-the-year chinook salmon sampled on the Taku River during October, 1977.

Fork Length	n	Fork Length	n	Fork Length	n
48	1	67	17	86	1
49	5	68	30	87	3
50	4	69	21	88	0
51	10	70	18	89	0
52	15	71	16	90	2
53	25	72	12	91	0
54	19	73	12	92	1
55	23	74	11	93	0
56	30	75	14	94	0
57	29	76	8	95	0
58	28	77	4	96	1
59	30	78	2		
60	42	79	3		
61	36	80	2	Total Sampled 629	
62	35	81	0		
63	39	82	1	$\bar{x}$ = 62.8 mm	
64	30	83	0		
65	32	84	0		
66	17	85	0		

field observations by State and Federal biologists and local citizens was prepared by Commercial Fisheries Biologist, Allan Kingsbury (unpublished).

He states that:

> Dead or dying pollock were observed in several of the major inside passages and inlets of northern Southeastern Alaska. Most observers described the dying pollock as very thin, often with ectoparasitic copepods and skin inflammations or sores. Fish swam in circles or erratically, belly up or on their sides.
>
> Six specimens were preserved and sent to the Department's pathology laboratory in Anchorage for examination. Four internal parasites were identified and further comments from the pathology report were that, "all species isolated do not usually kill the host fish so it is uncertain whether they are the cause of the observed mortality. However, the acanthocephalan and nematode infestations were unusually severe and it is possible that in combination they could be debilitating.

It appears quite possible that the lack of walleye pollock off of the mouth of Taku River during the smolt out-migration in May of 1977 was related to the observed dieoff of pollock.

Stikine River Studies

Drift Gillnet Fishery - Stikine River:

The Stikine River drift gillnet fishery was monitored from late April through mid-May to determine the biological characteristics of the harvest. Because only 274 chinook were harvested during the first four fishing periods the fishery was closed by emergency order in mid-May and did not reopen until the third Monday in June.

As in past sampling, age class 1.4 (six-year-olds) predominated in the catch (Table 11). Six chinook with adipose clips were sampled but not included in the age analysis. These chinook were all age 1.3 maturing Carson chinook returning to the Crystal Lake Hatchery.

Escapement:

Past interviews with Tahltan informants indicated that the Tahltan River system was the major chinook salmon spawning tributary of the Stikine River and a survey by helicopter during 1975 confirmed the importance of the Tahltan system (Kissner, 1977).

Because of a large landslide (cannery slide) which blocked access into the Tahltan in 1965, the 1977 return of six-year-old chinook was expected to be weak. An early closure of the spring drift gill net fishery at the mouth of the Stikine was thus made because of low catches during the first four fishing periods and because of the expected weak return. The

Table 11. Age analysis by percentage of gill net caught chinook salmon in the Stikine River, 1972-1977.

	1.2	1.3	1.4	1.5	2.3	2.4	n
1972	-	35.1	63.2	1.8	-	-	57
1973	1.1	22.0	71.4	5.5	-	-	91
1974	-	32.0	60.2	5.8	1.9	-	103
1975	3.3	20.0	70.0	5.0	1.7	-	120
1976	2.7	20.3	69.6	7.4	-	-	148
1977	-	36.6	56.3	5.6	-	1.4	71

resulting escapement into the Little Tahltan River was better than anticipated (Table 12). On July 30, approximately 800 chinook were enumerated between Hyland Ranch and the junction of the Little Tahltan and Tahltan rivers.

A partial barrier on the mainstem Tahltan at Tutesheta Falls caused large numbers of sockeye salmon to stray into the Little Tahltan River and because of warm water temperatures (16°C) the sockeye died before spawning and continually plugged the partial weir, which was constructed on July 30. Only a small number of spawned out chinook were thus sampled.

Several other tributaries were enumerated by fixed wing aircraft and a weir was operated on Andrews Creek in conjunction with egg take activities. The Katete River and its tributaries had an escapement of 290 chinook and Andrews Creek 412 chinook.

Juvenile Chinook Studies:

During May and November, 1977 investigations were conducted on juvenile chinook salmon in the Stikine River to determine habitat preference and number of juvenile chinook which could be captured by baited minnow traps for future coded wire tagging.

The mainstem Stikine River was minnow trapped from tidewater to the U.S.-Canadian Border on May 5, and 25. Only 40 chinook smolts and 528 juvenile coho were captured in 80 minnow trap sets. The major problem with trapping chinook smolts by minnow trap in the lower Stikine River, as in the lower Taku River, is the lack of suitable habitat to efficiently set traps.

In an effort to determine the availability of juvenile chinook salmon upstream from the U.S.-Canadian Border a fifteen day field trip was planned in early November to conduct preliminary coded wire tagging. This area contains more sloughs and a little more rearing habitat than down river. On November 10, after just two days of unproductive trapping (water temperature 33°F), the river began running heavy slush ice. The next two days were spent cruising through heavy sluch ice jams and we made it to salt water before freeze up.

The mainstem Stikine River does not appear to be a major rearing area for juvenile chinook salmon. The river is typically confined to one or two deep channels with little cover and few log jams available for rearing salmonids. Unlike the mainstem Taku River, the bottom is composed mostly of mud and silt. Capturing and tagging migrating chinook smolts will be attempted from the U.S.-Canadian Border upstream for about 20 miles during April and May, 1978, and continued efforts to locate concentrations of rearing juveniles will be conducted on the mainstem and several tributaries such as the Little Tahltan River, Chutine River, Christina Creek and the Iskut River during September and October.

Juvenile Chinook Studies on the Chickamin and Unuk Rivers

Preliminary minnow trapping was conducted on the Unuk and Chickamin rivers during May to determine the availability of chinook smolts for coded

Table 12. Little Tahltan River chinook escapement.

Year	Date	Chinook	Remarks
1956	August 11	334 jacks 493 adults	Hyland Ranch to Tahltan River
1957	July 21	199	Too early-fish schooled
1958	August 6	790	3/4 mile below Hyland to 1 1/2 miles below Saloon
1959	August 7	198	Fish in poor condition - survey too late
1960	August 5	346	1/4 mile below Hyland Ranch to a mile or two below Saloon
1967		800	Canadian survey
1975	August 13	700	Many spawned out
1976	August 7	400	Conditions fair
1977	July 30	800	Peak spawning

wire tagging. Twenty traps were dispersed over the lower five miles of the Unuk River on May 5, and 25, and only 18 chinook smolts and 216 juvenile coho were captured. Trapping on the Chickamin River during the same time period with 40 minnow traps produced only 22 chinook smolts and 141 juvenile coho salmon. Because of the relatively small populations of chinook in these river systems it appears quite possible that numbers of smolts or rearing juveniles necessary to determine oceanic distribution patterns can be captured by baited minnow traps for coded wire tagging.

It is recommended that additional investigative work to determine the number of juvenile chinook that can be captured by minnow traps be conducted in September and October, 1978, before a large scale tagging effort is initiated.

Escapement in Other Areas of Southeast Alaska

A summary of escapement enumeration in chinook salmon systems monitored annually is presented in Table 13.

Table 13. Peak escapement counts of chinook salmon in Southeast Alaska rivers.

King Salmon River (Admiralty Island)

Year	Chinook	Method
1957	200	Foot
1961	117	Foot
1971	94	Foot
1972	90	Foot
1973	211	Foot
1974	104	Foot
1975	42	Foot
1976	65	Foot, Helicopter
1977	134	Foot, Helicopter

Chilkat River (Big Boulder Creek)

Year	Chinook	Method
1960	316	Foot
1966	330	Foot
1967	150	Foot
1968	259	Foot
1970	176	Foot
1974	0	Foot
1975	21	Foot
1976	25	Foot, Helicopter
1977	25	Foot, Helicopter

Unuk River

Year	Chinook	Method
1961	673	Foot
1962	331	Air
1963	1,070	Air
1968	650	Air
1969	475	Air
1972	885	Air
1973	182	Air
1975	55	Helicopter
1976	198	Helicopter
1977	1,166	Foot, Helicopter

Table 13. Continued.

Chickamin River

Year	Chinook	Method
1961	336	Ground
1962	775	Air
1963	450	Air
1969	345	Air
1972	860	Air
1973	229	Helicopter
1974	176	Helicopter
1975	351	Helicopter
1976	122	Helicopter
1977	235	Helicopter

Wilson - Blossom River

Year	Chinook	Method
1961	68	Ground
1963	825	Air
1972	500	Air
1974	166	Helicopter
1975	153	Helicopter
1976	68	Helicopter
1977	112	Helicopter

Keta River

Year	Chinook	Method
1948	500	Foot
1950	210	Foot
1951	120	Foot
1952	462	Foot
1953	156	Foot
1954	300	Air
1955	1,000*	Air
1956	1,500*	Air
1957	500*	Air
1961	44	Ground
1975	203	Helicopter
1976	84	Helicopter
1977	230	Helicopter

* Probably chum Salmon

Table 13. Continued.

Situk River		
Year	Chinook	Method
1928	1,224	Weir
1929	3,559	Weir
1930	1,455	Weir
1931	2,967	Weir
1932	1,978	Weir
1933	---	---
1934	1,486	Weir
1935	638**	Weir
1936	816	Weir
1937	1,290**	weir
1938	2,668**	Weir
1939	2,117	Weir
1940	903	Weir
1941	2,594	Weir
1942	2,543	Weir
1943	3,546**	Weir
1944	2,906	Weir
1945	1,458	Weir
1946	4,284	Weir
1947	5,077	Weir
1948	3,744	Weir
1949	1,978	Weir
1950	2,011	Weir
1951	2,780	Weir
1952	1,459	Weir
1953	1,040	Weir
1954	2,101	Weir
1955	1,571	Weir
1971	964	Weir
1972	400	Float
1973	510	Float
1974	702	Float
1975	1,180	Float
1976	1,942	Weir
1977	1,724	Weir

** Weir out part of the time

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